



Technologies available for tackling stubble burning problems in northern part of India

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Introduction: Stubble burning is a practice of clearing agricultural fields by burning crop residues especially rice, wheat *i.e.* left on the land after harvesting (by the means of combine harvester and reaper and does not include manual harvesting). The major aim of the farmers behind the stubble burning is that it provides immediate clean field (residue free) and makes it suitable for the tillage operation for sowing of the next crop. It is the easiest, fastest and cheapest means that allows the farmer timely sowing of the next crop in the same field. There is one month duration tentatively from the 15th of October to 15th of November every year and within this period, this practice is performed in some parts of India, especially in Haryana and Punjab region.

Problems associated with stubble burning:

– Due to stubble burning, many greenhouse gases are released into the environment and it further contributes to global warming and climate change problems.

– Some studies also highlighted the negative contribution of the stubble burning to degrade the quality of atmospheric air in the neighborhood union territory, such as Delhi. Last in past years, Government of Delhi had to implement many policies like SAFAR (System of Air

Quality and Weather Forecasting) and odd even vehicle policy to curb the air pollution in Delhi, due to the stubble burning.

– Ecological loss – On the agricultural field, there are many natural small ecosystems consisting of different varieties of micro animals, that get burnt in the stubble burning practice.

– Loss of quality of soil – Every soil contains many macro and micro nutrients, which is required for the growth of the crops which is also degraded due to stubble burning.

Possible solutions for stubble burning:

Happy seeder : It uproots the stubble along the sowing row using the flail, mounted on the rotary mechanism and allows direct sowing in a single operation. It eliminates the requirement of field clearing practices by the burning methods. It helps conservation of ecology, soil quality and decreases the unnecessary expenses on the tillage operation in the field to be conducted for sowing of the next crop.

Pusa bio-decomposer : It has been developed recently by the scientists at the Indian Agricultural Research Institute, (IARI), Pusa, New Delhi. It is in the form of capsules, developed by extracting fungi strains, which



Fig. 1: A view of stubble burning practice



Fig. 2 : A view of happy seeder

decomposes the paddy residual at a much faster rate than usual. These fungi strains produces the essential enzymes

for the decomposition process. It takes approximately 20 days for completion of the degradation process.

Other farm machineries : There are number of machineries available in the market to deal with the stubble related problems such as the straw reaper combine, straw bailer and hay rakes, etc. The straw chaff can further be used for the bricks kiln and animal fodder purposes.

Torrefaction technology : It is a thermal process, which converts biomass into coal like material. It offers better fuel characteristics than the original biomass. Main product of the technology are the solid parts, torrefied biomass and combustible gases. The combustible gases could be used for the heating purposes as required.



Fig. 3 : Bio decomposer capsule



Fig. 4 : Spraying solution of decomposer on crop residue



Fig. 5: A view of (a) straw reaper combine (b) straw bailer and (c) multi rotor hay rakes for management of paddy and wheat residue

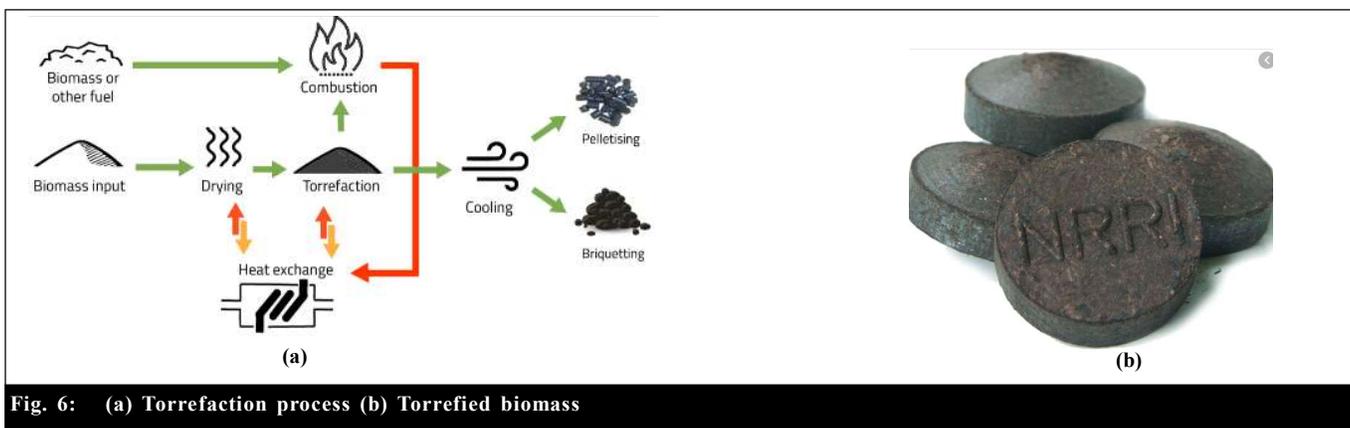


Fig. 6: (a) Torrefaction process (b) Torrefied biomass